

# Switch Amplifier

## KFD2-SR2-Ex1.W.LB

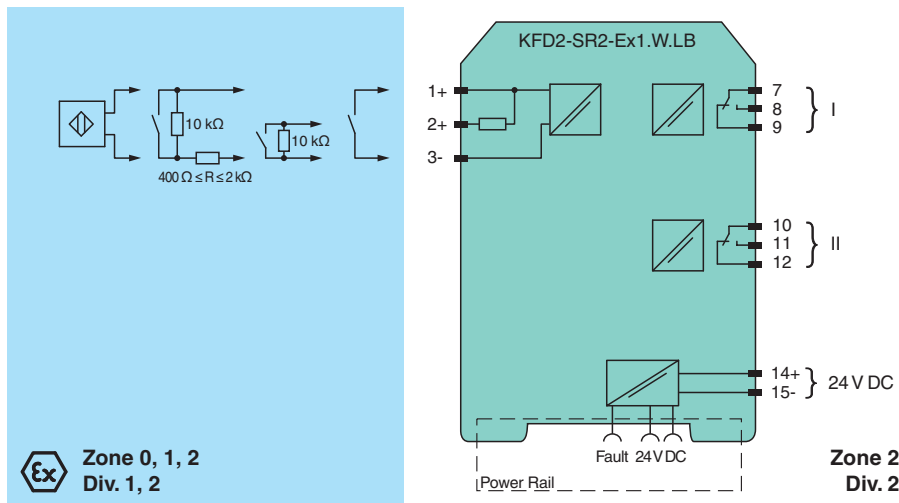
- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- Usable as signal splitter (1 input and 2 outputs)
- Relay contact output
- Fault relay contact output
- Line fault detection (LFD)
- Reversible mode of operation
- Up to SIL 2 (SC 3) acc. to IEC/EN 61508



### Function

This isolated barrier is used for intrinsic safety applications. The device transfers digital signals from NAMUR sensors or dry contacts from the hazardous area to the non-hazardous area. The proximity sensor or the mechanical contact controls the control side load for a relay contact output. The device output changes the state when the input signal changes the state. Via switches the mode of operation can be reversed and the line fault detection can be switched off. During a fault condition, the relay reverts to its de-energized state and the LEDs indicate the fault according to NAMUR NE 44. If the device is operated via Power Rail, additionally a collective error message is available.

### Connection



### Technical Data

|                                      |                |                                  |
|--------------------------------------|----------------|----------------------------------|
| General specifications               |                |                                  |
| Signal type                          |                | Digital Input                    |
| Functional safety related parameters |                |                                  |
| Safety Integrity Level (SIL)         |                | SIL 2                            |
| Systematic capability (SC)           |                | SC 3                             |
| Supply                               |                |                                  |
| Connection                           |                | Power Rail or terminals 14+, 15- |
| Rated voltage                        | U <sub>r</sub> | 19 ... 30 V DC                   |
| Ripple                               |                | ≤ 10 %                           |
| Rated current                        | I <sub>r</sub> | ≤ 45 mA                          |

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Technical Data

|                                                                |                                                                                                  |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Power dissipation                                              | ≤ 0.9 W                                                                                          |
| Power consumption                                              | ≤ 0.9 W                                                                                          |
| <b>Input</b>                                                   |                                                                                                  |
| Connection side                                                | field side                                                                                       |
| Connection                                                     | terminals 1+, 2+, 3-                                                                             |
| Rated values                                                   | acc. to EN 60947-5-6 (NAMUR)                                                                     |
| Open circuit voltage/short-circuit current                     | approx. 8 V DC / approx. 8 mA                                                                    |
| Switching point/switching hysteresis                           | 1.2 ... 2.1 mA / approx. 0.2 mA                                                                  |
| Line fault detection                                           | breakage $I \leq 0.1$ mA , short-circuit $I > 6$ mA                                              |
| Pulse/Pause ratio                                              | min. 20 ms / min. 20 ms                                                                          |
| <b>Output</b>                                                  |                                                                                                  |
| Connection side                                                | control side                                                                                     |
| Connection                                                     | output I: terminals 7, 8, 9 ; output II: terminals 10, 11, 12                                    |
| Output I                                                       | signal ; relay                                                                                   |
| Output II                                                      | signal or fault message ; relay                                                                  |
| Contact loading                                                | 250 V AC/2 A/cos $\phi > 0.75$ ; 126.5 V AC/4 A/cos $\phi > 0.75$ ; 40 V DC/2 A resistive load   |
| Minimum switch current                                         | 2 mA / 24 V DC                                                                                   |
| Energized/De-energized delay                                   | approx. 20 ms / approx. 20 ms                                                                    |
| Mechanical life                                                | 10 <sup>7</sup> switching cycles                                                                 |
| Collective error message                                       | Power Rail                                                                                       |
| <b>Transfer characteristics</b>                                |                                                                                                  |
| Switching frequency                                            | ≤ 10 Hz                                                                                          |
| <b>Galvanic isolation</b>                                      |                                                                                                  |
| Input/Output                                                   | reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub> |
| Input/power supply                                             | reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub> |
| Output/power supply                                            | reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub> |
| Output/Output                                                  | reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub> |
| <b>Indicators/settings</b>                                     |                                                                                                  |
| Display elements                                               | LEDs                                                                                             |
| Control elements                                               | DIP switch                                                                                       |
| Configuration                                                  | via DIP switches                                                                                 |
| Labeling                                                       | space for labeling at the front                                                                  |
| <b>Directive conformity</b>                                    |                                                                                                  |
| Electromagnetic compatibility                                  |                                                                                                  |
| Directive 2014/30/EU                                           | EN 61326-1:2013 (industrial locations)                                                           |
| Low voltage                                                    |                                                                                                  |
| Directive 2014/35/EU                                           | EN 61010-1:2010+A1:2019+A1:2019/AC:2019                                                          |
| <b>Conformity</b>                                              |                                                                                                  |
| Electromagnetic compatibility                                  | NE 21:2017 , EN 61326-3-1:2017 , EN IEC 61326-3-2:2018                                           |
| Degree of protection                                           | IEC 60529:1989+A1:1999+A2:2013                                                                   |
| Functional safety                                              | IEC/EN 61508:2010                                                                                |
| Input                                                          | EN 60947-5-6:2000                                                                                |
| <b>Ambient conditions</b>                                      |                                                                                                  |
| Ambient temperature                                            | -40 ... 70 °C (-40 ... 158 °F)                                                                   |
| <b>Mechanical specifications</b>                               |                                                                                                  |
| Degree of protection                                           | IP20                                                                                             |
| Connection                                                     | screw terminals                                                                                  |
| Mass                                                           | approx. 150 g                                                                                    |
| Dimensions                                                     | 20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) (W x H x D) , housing type B2                           |
| Mounting                                                       | on 35 mm DIN mounting rail acc. to EN 60715:2001                                                 |
| <b>Data for application in connection with hazardous areas</b> |                                                                                                  |
| EU-type examination certificate                                | PTB 00 ATEX 2080                                                                                 |

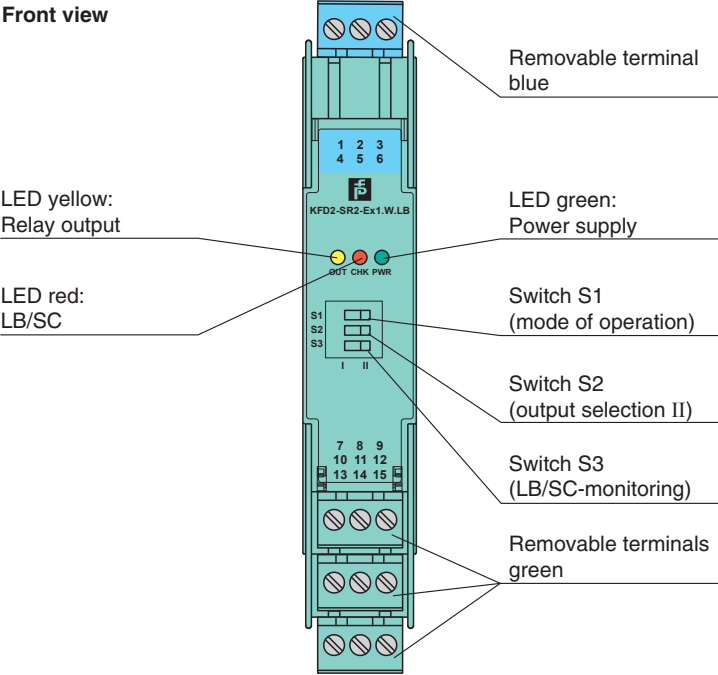
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## Technical Data

|                                |                |                                                                                                                                                                                                 |
|--------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marking                        |                | Ⓜ II (1)G [Ex ia Ga] IIC<br>Ⓜ II (1)D [Ex ia Da] IIIC<br>Ⓜ I (M1) [Ex ia Ma] I                                                                                                                  |
| Input                          |                | Ex ia                                                                                                                                                                                           |
| Voltage                        | U <sub>o</sub> | 10.5 V                                                                                                                                                                                          |
| Current                        | I <sub>o</sub> | 13 mA                                                                                                                                                                                           |
| Power                          | P <sub>o</sub> | 34 mW (linear characteristic)                                                                                                                                                                   |
| Supply                         |                |                                                                                                                                                                                                 |
| Maximum safe voltage           | U <sub>m</sub> | 253 V AC / 125 V DC (Attention! U <sub>m</sub> is no rated voltage.)                                                                                                                            |
| Output                         |                |                                                                                                                                                                                                 |
| Maximum safe voltage           | U <sub>m</sub> | 253 V AC (Attention! The rated voltage can be lower.)                                                                                                                                           |
| Fault indication output        |                |                                                                                                                                                                                                 |
| Maximum safe voltage           | U <sub>m</sub> | 40 V DC (Attention! U <sub>m</sub> is no rated voltage.)                                                                                                                                        |
| Certificate                    |                | PF 08 CERT 0803                                                                                                                                                                                 |
| Marking                        |                | Ⓜ II (3)G [Ex ic Gc] IIC                                                                                                                                                                        |
| Input                          |                | Ex ic                                                                                                                                                                                           |
| Voltage                        | U <sub>o</sub> | 10.5 V                                                                                                                                                                                          |
| Current                        | I <sub>o</sub> | 13 mA                                                                                                                                                                                           |
| Power                          | P <sub>o</sub> | 34 mW (linear characteristic)                                                                                                                                                                   |
| Certificate                    |                | TÜV 99 ATEX 1493 X                                                                                                                                                                              |
| Marking                        |                | Ⓜ II 3G Ex ec nC IIC T4 Gc                                                                                                                                                                      |
| Galvanic isolation             |                |                                                                                                                                                                                                 |
| Input/Output                   |                | safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V                                                                                                                     |
| Input/power supply             |                | safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V                                                                                                                     |
| Directive conformity           |                |                                                                                                                                                                                                 |
| Directive 2014/34/EU           |                | EN IEC 60079-0:2018+AC:2020 , EN 60079-7:2015+A1:2018 , EN 60079-11:2012 , EN IEC 60079-15:2019                                                                                                 |
| <b>International approvals</b> |                |                                                                                                                                                                                                 |
| FM approval                    |                |                                                                                                                                                                                                 |
| FM certificate                 |                | FM19US0207X                                                                                                                                                                                     |
| Control drawing                |                | 116-0035                                                                                                                                                                                        |
| UL approval                    |                | E106378                                                                                                                                                                                         |
| Control drawing                |                | 116-0473 (cULus)                                                                                                                                                                                |
| Contact loading                |                | 250 V AC/2 A/cos $\phi$ > 0.75; 126.5 V AC/4 A/cos $\phi$ > 0.75; 30 V DC/2 A resistive load                                                                                                    |
| IECEx approval                 |                |                                                                                                                                                                                                 |
| IECEx certificate              |                | IECEx PTB 11.0034 , IECEx TUN 19.0013X                                                                                                                                                          |
| IECEx marking                  |                | [Ex ia Ga] IIC<br>[Ex ia Da] IIIC<br>[Ex ia Ma] I<br>Ex ec nC IIC T4 Gc                                                                                                                         |
| <b>General information</b>     |                |                                                                                                                                                                                                 |
| Supplementary information      |                | Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> . |

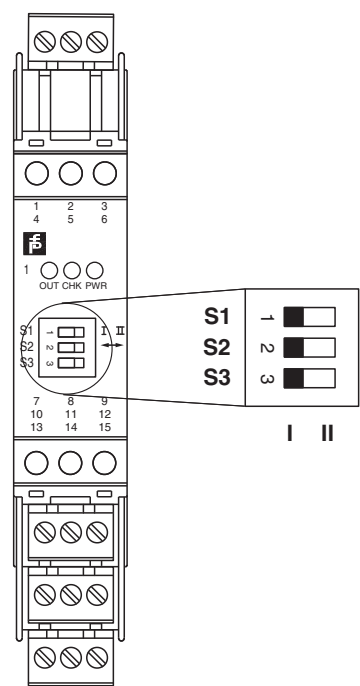
Assembly

Front view



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Configuration



Switch position

| S | Function                                     | Position                                        |
|---|----------------------------------------------|-------------------------------------------------|
| 1 | Mode of operation output I (relay) energized | with high input current                         |
|   |                                              | with low input current                          |
| 2 | Assignment output II (relay)                 | Switching state like output I                   |
|   |                                              | Fault indication output (de-energized if fault) |
| 3 | Line fault detection                         | ON                                              |
|   |                                              | OFF                                             |

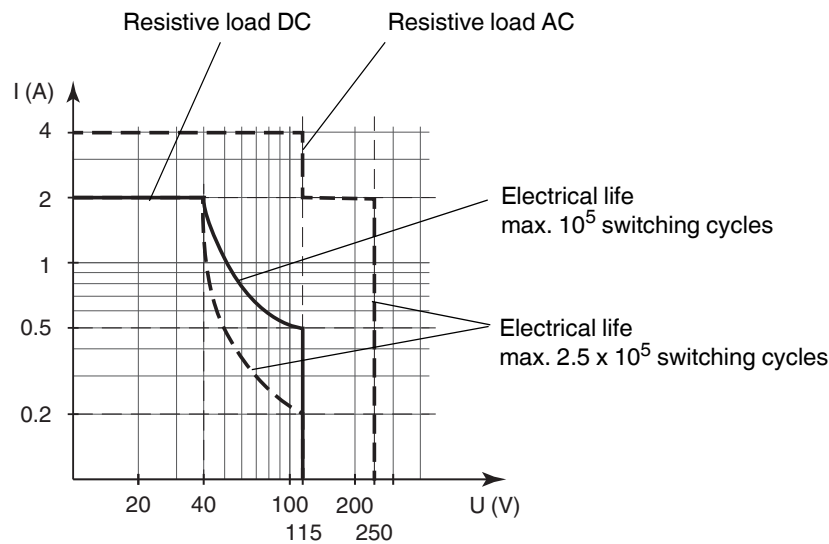
Operating states

| Control circuit                         | Input signal       |
|-----------------------------------------|--------------------|
| Initiator high impedance/contact opened | low input current  |
| Initiator low impedance/contact closed  | high input current |
| Lead breakage, lead short circuit       | Line fault         |

Factory setting: switch 1, 2 and 3 in position I

Characteristic Curve

Maximum switching power of output contacts



The maximum number of switching cycles is depending on the electrical load and may be higher when reduced currents and voltages are applied.